

**REMARKS**

This amendment is filed in response to the Office Action dated September 20, 2006. In view of this amendment, this application should be allowed and the case passed to issue.

No new matter is introduced by this amendment. The amendment to claim 1 is supported by the specification at the first full paragraph on page 13 and page 24, lines 4-12. Support for the amendment to claim 9 is found in originally filed claim 1. Claims 5, 10, and 13 are amended to correct informalities.

Claims 1-14 are pending in this application. Claim 13 is withdrawn from consideration pursuant to an election of species requirement. Claims 1-12 and 14 are rejected. Claims 1, 5, 9, 10, and 13 are amended in this response.

***Interview Summary***

Applicants gratefully acknowledge the courtesy of Examiner Lee in granting a personal interview with the undersigned on January 25, 2007. During the interview, the undersigned discussed proposed amendments, explained the data to be presented in the Dr. Yoshizawa declaration, and explained the differences between primary and secondary particles and the distribution of particles taught by Miyasaka. Examiner Lee indicated that explanations would be given further consideration upon the filing of a written response and declaration.

***Information Disclosure Statement***

Although the Examiner indicated that the IDS filed December 13, 2005 was considered, a copy of only the second page of the PTO-1449 was attached to the Office Action. For the Examiner's convenience, a copy of the first page of the PTO-1449, as downloaded from PAIR, is attached to this response. It is respectfully requested that the Examiner include an initialed copy of the first page of the PTO-1449 filed December 13, 2005 in the next official action.

***Claim Rejections Under 35 U.S.C. § 112***

Claims 4 and 7 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because R3-m was unclear. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

One of ordinary skill in this art would know that R3-m is a known crystal structure, as evidenced by the Ohzuku et al. references that the Examiner cited as prior art (*see* Ohzuku et al., Chemistry Letters, CL-010390, Vol. 30 (2001), No. 7, p. 642; and Ohzuku et al., Chemistry Letters, CL-010410, Vol. 30 (2001), No. 8, p. 744). As is well known in crystallography, an R-3m structure belongs to rhombohedral structures. The rhombohedral structure is a subset of hexagonal crystal structures and are often replaced with hexagonal structures. Hexagonal structures include crystal lattices 3 times as much as rhombohedral structures. An axis relation of hexagonal structures is simpler than that of rhombohedral structures. Thus, the rhombohedral-hexagonal replacement is well-known. Please see attached Exhibit 1, which illustrates the hexagonal structure of a lithium transition metal oxide.

Claim 5 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because the term "substantially" is a relative term. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

Though Applicants believe claim 5 is definite to one of ordinary skill in this art, in order to advance the prosecution of this application, claim 5 has been amended to correct the asserted informality.

Claim 10 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because the range for Mx includes negative numbers. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

Claim 10 has been amended to correct the informalities noted by the Examiner.

Applicants submit the present claims fully comport with the requirements of 35 U.S.C. § 112.

***Claim Rejections Under 35 U.S.C. §§ 102 and 103***

Claims 1-8, 10-12, and 14 were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Ohzuku et al. (Chemistry Letters, CL-010390, Vol. 30 (2001), No. 7, pp. 642-43). The Examiner asserted that CL-010390 discloses a positive electrode material comprising  $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$ .

Claims 1-8, 10-12, and 14 were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Ohzuku et al. (Chemistry Letters, CL-010410, Vol. 30 (2001), No. 8, pp. 744-45). The Examiner asserted that CL-010410 discloses a positive electrode material comprising  $\text{LiNi}_{1/2}\text{Mn}_{1/2}\text{O}_2$ .

These rejections are traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the present invention, as claimed, and the cited prior art.

An aspect of the present invention, per claim 1, is a positive electrode active material comprising a lithium-containing composite oxide containing at least nickel and manganese elements, said positive electrode active material comprising primary particles of the composite oxide having a twinning portion, the composite oxide further contains cobalt element, and the nickel, manganese, and cobalt elements are dispersed at the atomic level.

The positive electrode active material of the present invention is not anticipated by or obvious in view of the Ohzuku et al. references because the Ohzuku et al. references do not disclose or suggest the composite oxide having a twinning portion and the composite oxide further

containing cobalt element, and the nickel, manganese, and cobalt elements are dispersed at the atomic level, as required by claim 1.

Ohzuku et al. (CL-010410) do not suggest the composite oxide further contains cobalt element, as required by claim 1. Ohzuku et al. (L-010390) do not suggest that the cobalt element, and the nickel, manganese, and cobalt elements are dispersed at the atomic level, as required by claim 1.

As explained in the declaration under 37 C.F.R. § 1.132 by Dr. Yoshizawa, which is being filed concurrently with this response, positive electrode active material fabricated according to Chemistry Letters, CL-010390 exhibit a non-uniform elemental distribution. Exhibit A, as indicated by the Co-rich and Co-poor areas, clearly shows a widely varying distribution of cobalt in the Chemistry Letters, CL-010390 positive electrode active material. In contrast thereto, Exhibits A and B clearly illustrate that cobalt is uniformly dispersed throughout the positive electrode material according to the present invention. As illustrated in Exhibits A and B, the material according to the present invention is clearly distinguishable over the prior art material.

In the micrographs attached to the declaration, red indicates a high concentration of the element being measured, green represents a low concentration, and yellow represents an intermediate concentration, for each of Ni, Mn, Co. Thus, the Co map only shows Co concentration, the Ni map only shows Ni concentration, and the Mn map only shows Mn concentration.

Because  $\text{CoCO}_3$  and nickel manganese hydroxide are used as a raw material in CL-010390, segregation of Co is observed in the  $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$ . In contrast thereto, in the

present invention a triple hydroxide is used as the raw material (*see* page 24, lines 14-15) resulting in a favorable dispersion of Co.

The Examiner asserted that Ohzuku et al. inherently discloses the claimed material. However, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). "Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999)(citations omitted). In view of the data presented in Dr. Yoshizawa's declaration it is clear that CL-010390 does not inherently disclose the positive electrode active material as required by claim 1.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the disclosure in a single reference of each element of a claimed invention. *Helifix Ltd. v. Blok-Lok Ltd.*, 208 F.3d 1339, 54 USPQ2d 1299 (Fed. Cir. 2000); *Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994); *Hoover Group, Inc. v. Custom Metalcraft, Inc.*, 66 F.3d 399, 36 USPQ2d 1101 (Fed. Cir. 1995); *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051 (Fed. Cir. 1987). Because Ohzuku et al. (CL-010390) and (CL-010410) do not disclose positive electrode active material comprising primary particles of the composite oxide having a twining portion, containing cobalt element, and the nickel, manganese, and cobalt elements are dispersed at the atomic level, as required by claim 1, Ohzuku et al. (CL-010390) and (CL-010410) do not anticipate claim 1.

Obviousness can be established only by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Fine*, F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Ohzuku et al. (CL-010390) and (CL-010410) do not suggest positive electrode active material comprising primary particles of the composite oxide having a twinning portion, containing cobalt element, and the nickel, manganese, and cobalt elements are dispersed at the atomic level, as required by claim 1

The only teaching of the claimed positive electrode active material comprising primary particles of the composite oxide having a twinning portion, containing cobalt element, and the nickel, manganese, and cobalt elements are dispersed at the atomic level is found in Applicants' disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claim 9 was rejected under 35 U.S.C. § 103(a) as obvious over Ohzuku et al. (Chemistry Letters, CL-010390, Vol. 30 (2001), No. 7, pp. 642-43) in view of Miyasaka (U.S. Pat. No. 6,416,902).

Claim 9 was rejected under 35 U.S.C. § 103(a) as obvious over Ohzuku et al. (Chemistry Letters, CL-010410, Vol. 30 (2001), No. 8, pp. 744-45) in view of Miyasaka (U.S. Pat. No. 6,416,902).

These rejections are traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the present invention, as claimed, and the cited prior art.

An aspect of this invention, per claim 9, is a positive electrode active material comprising a lithium-containing composite oxide containing at least nickel and manganese elements. The positive electrode active material comprises primary particles of the composite oxide having a twinning portion. The primary particles have a particle size of 0.1 to 2  $\mu\text{m}$  and the composite oxide further comprises secondary particles with a particle size of 2 to 20  $\mu\text{m}$ .

The Examiner asserted that CL-010390 and CL-010410 disclose a positive electrode material comprising  $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$  and  $\text{LiNi}_{1/2}\text{Mn}_{1/2}\text{O}_2$ , respectively but do not disclose the claimed primary and secondary particles. The Examiner averred that Miyasaka discloses the primary and secondary particles.

It would not have been obvious to combine CL-010390 or CL-010410 with Miyasaka to achieve the claimed positive electrode active material. Miyasaka teaches away from the claimed positive electrode active material, therefore it is inappropriate to combine Miyasaka with CL-010390 or CL-010410. Miyasaka is directed to a positive active electrode material in which X is a halogen atom. Miyasaka is directed to a different materials than CL-010390 and CL-010410. The positive active materials of CL-010390 and CL-010410 do not contain any halogen atom, as does Miyasaka.

It would be further unobvious to combine Miyasaka with CL-010390 because Miyasaka does not teach the Examiner-asserted motivation for providing the claimed primary and secondary particles. Furthermore, and the Examiner-asserted two distributions of particles are not primary and secondary particles, as claimed. As is known to one of ordinary skill in this art,

secondary particles are formed by aggregating primary particles. In other words, secondary particles are distinct particles formed from primary particles, not merely different-sized particles as the Examiner has apparently asserted.

The only teaching of the claimed positive electrode active material in which the lithium-containing composite oxide has a particle size of 0.1 to 2  $\mu\text{m}$  and secondary particles of the crystal particles having a particle size of 2 to 20  $\mu\text{m}$  is found in Applicants' disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The Examiner's retrospective assessment of the claimed invention and use of unsupported conclusory statements are not legally sufficient to generate a case of *prima facie* obviousness. The motivation for modifying the prior art must come from the prior art and must be based on facts. The Examiner is not free to ignore the judicial requirement for **facts**. To do so is legal error. *In re Lee*, 277 F.3d 1338 (Fed. Cir. 2002). It is apparent that the Examiner has relied on improper hindsight reasoning in reaching the conclusion of obviousness.

The dependent claims are allowable for at least the same reasons as independent claim 1, and further distinguish the claimed positive electrode active material.

In view of the above amendments and remarks, Applicants submit that this application should be allowed and passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,



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including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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